United States Environmental Protection Agency

Office of Pollution Prevention and Toxics (7408)

EPA 745-S-95-001

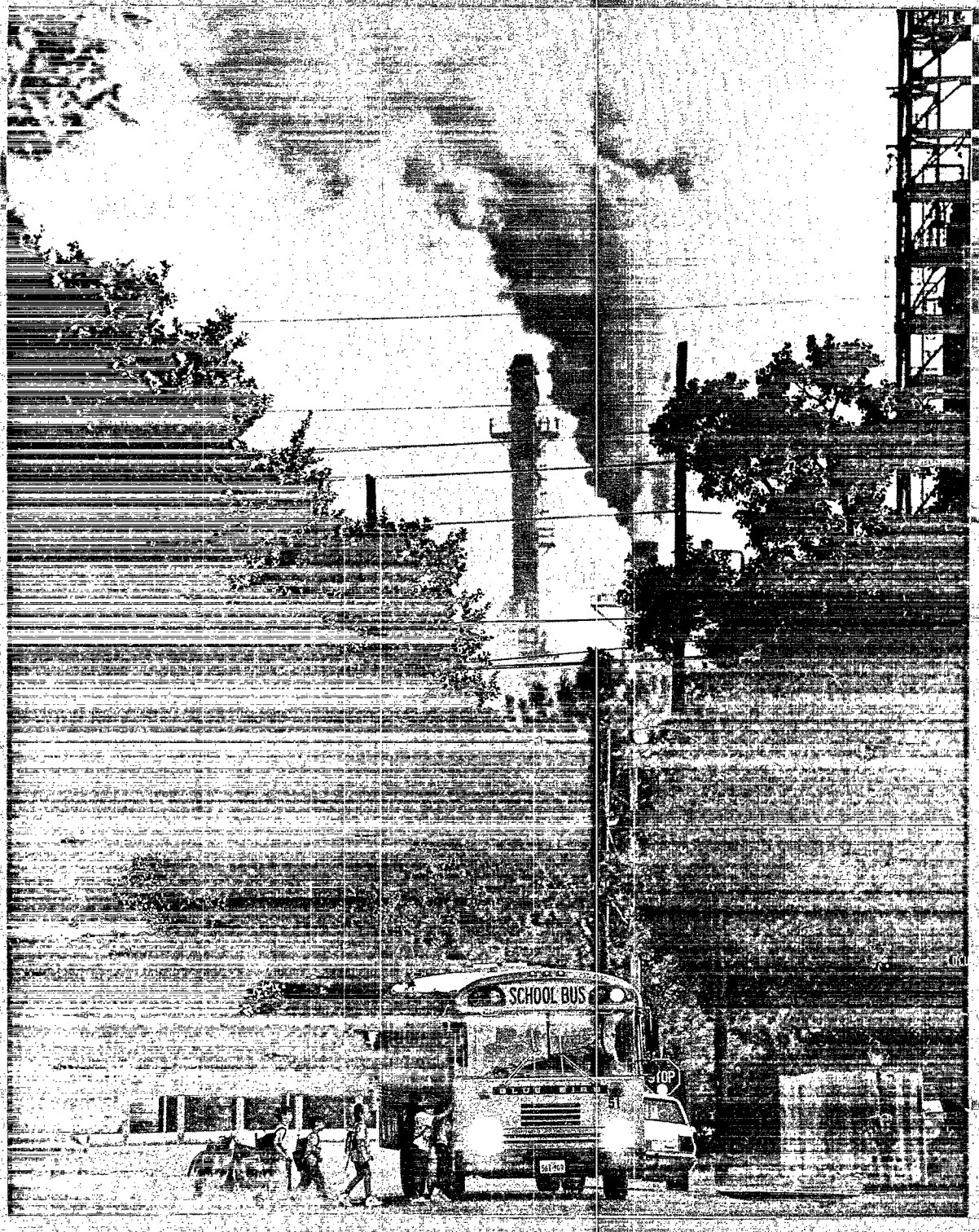
March 1995

EPA

1993 Toxics Release Inventory

Public Data Release

Executive Summary



How Can I Learn More about TRI?

1993 PUBLIC DATA RELEASE REPORTS

This booklet summarizes the 1993 Toxics Release Inventory (TRI) data. More detailed information appears in the *1993 Toxics Release Inventory Public Data Release* and *1993 Toxics Release Inventory Public Data Release State Fact Sheets*. These documents can be obtained from EPA using the order form on the inside back cover of this booklet.

EPCRA HOTLINE

EPA operates a toll-free Emergency Planning and Community Right-to-Know Act (EPCRA) Hotline to provide information to the public and to the reporting community about TRI and other aspects of EPCRA. The EPCRA Hotline can answer your questions about TRI and help you obtain TRI-related publications. Call 1-800-535-0202; Monday – Friday, 8:30 a.m. to 7:30 p.m. Eastern Time.

STATE AND EPA REGIONAL TRI CONTACTS

Each of the 10 EPA regional offices has a TRI coordinator who can help you find out more about TRI programs in your state and region. Each state has also designated a TRI contact. These state and EPA regional TRI contacts are listed at the back of this booklet.

DATABASE ACCESS

The complete TRI database is available to the public in a variety of electronic formats. On-line access is available through the National Library of Medicine's TOXNET system and through the Right-to-Know Network (RTK NET), an on-line environmental network. TRI data are also available on CD-ROM, diskette, and magnetic tape. Data tables and text files from the public data release documents are accessible on the Internet.

EPA operates a TRI User Support Service to help the public obtain, use, and understand the TRI data. Specialists are available to answer questions and provide data search assistance. Call 202-260-1531; Monday – Friday, 8:00 a.m. to 4:30 p.m. Eastern Time.

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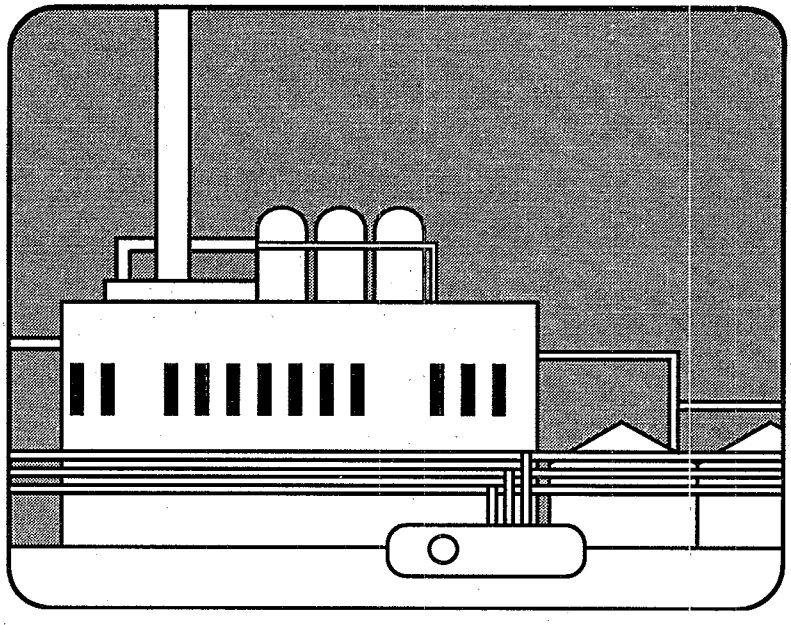
Executive Summary



U.S. Environmental Protection Agency

Office of Pollution Prevention and Toxics (7408)

Washington, DC 20460

1993 TOXICS RELEASE INVENTORY

EXECUTIVE SUMMARY

INTRODUCTION: WHAT IS THE TOXICS RELEASE INVENTORY?

The Toxics Release Inventory (TRI) is a database which provides information to the public about releases of toxic chemicals from manufacturing facilities into the environment. TRI was established under the Emergency Planning and Community Right-to-Know Act of 1986 and expanded under the Pollution Prevention Act of 1990. Facilities report their TRI information annually to EPA and to the state in which they are located.

Who Must Report to TRI?

A facility must report to TRI if it:

- Conducts manufacturing operations within Standard Industrial Classification (SIC) codes 20 through 39 (see Box E-5);
- Has 10 or more full-time employees; and
- Manufactures or processes more than 25,000 pounds or uses more than 10,000 pounds of any listed chemical during the calendar year.

Box E-1.

What Must Be Reported?

Information reported by facilities includes:

- Amounts of each listed chemical released to the environment at the facility;
- Amounts of each chemical shipped from the facility to other locations for recycling, energy recovery, treatment, or disposal;
- Amounts of each chemical recycled, burned for energy recovery, or treated at the facility;
- Maximum amount of the chemical present on-site at the facility during the year;
- Types of activities conducted at the facility involving the toxic chemical;
- Source reduction activities undertaken to prevent pollution and waste generation;
- Environmental permits held by the facility;
- Name and telephone number of a person to contact at the facility for more information.

Box E-2.

An Explanation of Releases

Releases. A release is an on-site discharge of a toxic chemical to the environment. This includes emissions to the air, discharges to bodies of water, releases at the facility to land, as well as contained disposal into underground injection wells.

Air Releases. Releases to air are reported either as stack or fugitive emissions. Stack emissions are releases to air that occur through confined air streams, such as stacks, vents, ducts, or pipes. Fugitive emissions are all releases to air that are not released through a confined air stream. Fugitive emissions include equipment leaks, evaporative losses from surface impoundments and spills, and releases from building ventilation systems.

Surface Water Releases. Releases to water include discharges to streams, rivers, lakes, oceans, and other bodies of water. This includes releases from contained sources, such as industrial process outflow pipes or open trenches. Releases due to runoff, including stormwater runoff, are also reportable to TRI.

Underground Injection. Underground injection is a contained release of a fluid into a subsurface well for the purpose of waste disposal. Most underground injection reported to TRI involves injection of waste into Class I or Class V wells. Class I wells are used to inject liquid hazardous wastes or industrial and municipal waste-waters beneath the lowermost underground source of drinking water. Class V wells are generally used to inject non-hazardous fluid into or above an underground source of drinking water. Currently, TRI reporting does not distinguish between these two types of wells, although there are important differences in environmental impact.

Land Releases. Releases to land occur within the boundaries of the reporting facility. Releases to land include disposal of toxic chemicals in landfills (in which wastes are buried), land treatment/application farming (in which a waste containing a listed chemical is applied to or incorporated into soil), surface impoundments (which are uncovered holding areas used to volatilize and/or settle waste materials), and other land disposal methods (such as spills, leaks, or waste piles).

Box E-3.

CHAPTER 1: 1993 TRI RELEASES AND TRANSFERS

For 1993, TRI reporting was required for 316 chemicals and 20 chemical categories. Facilities file a separate reporting form, called a "Form R," for each chemical they manufacture, process, or use in excess of reporting thresholds. Facilities report the amount of each listed chemical they release to the air, water, and land, as well as the amount they inject into underground disposal wells. Box E-3 explains these release types.

TRI data alone cannot indicate the risk that chemical releases pose to human health and the environment. Though the TRI data are useful as a starting point in identifying potential risks, other information is required to evaluate the risk in a particular area. A determination of risk depends on many factors, including: the toxicity of the chemical, the extent of exposure, the type of release, and the conditions of the environment. For example, small releases of highly toxic chemicals may present a greater risk than large releases of less toxic chemicals. Direct releases, such as air emissions, may pose a greater threat to human health and the environment than more contained releases, such as underground injection.

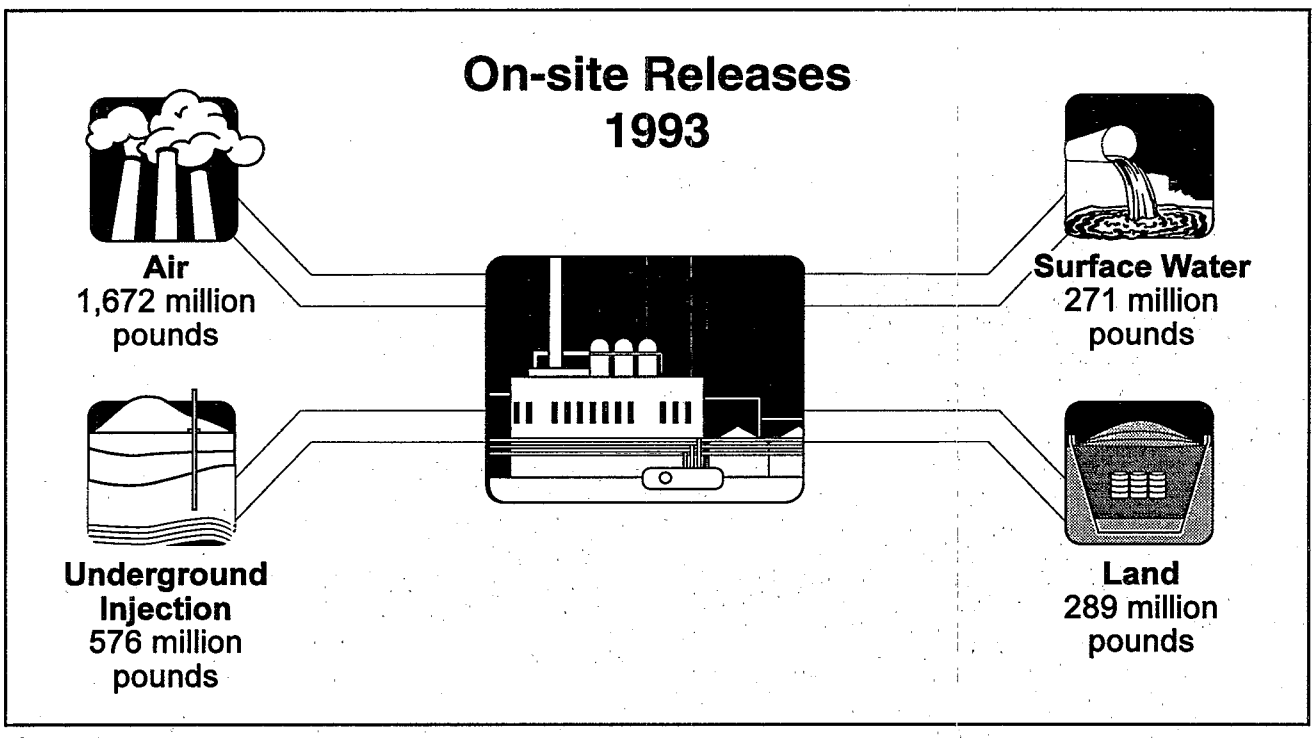


Figure E-1.

On-Site Releases

More than 23,000 facilities filed nearly 80,000 Form Rs for 1993. These facilities released more than 2.8 billion pounds of listed toxic chemicals into the nation's environment in 1993. Figure E-1 shows the quantity of listed chemicals released to the air, water, and land and injected underground.

Figure E-2 shows the distribution of toxic chemical releases by type of release. Air emissions constituted nearly 60% of all toxic chemical releases in 1993. Surface water releases, which include releases to rivers, lakes, oceans, and other bodies of water, accounted for nearly 10% of all releases. Releases to land, which include landfills, surface impoundments, and other types of land disposal, accounted for about 10% of all releases.

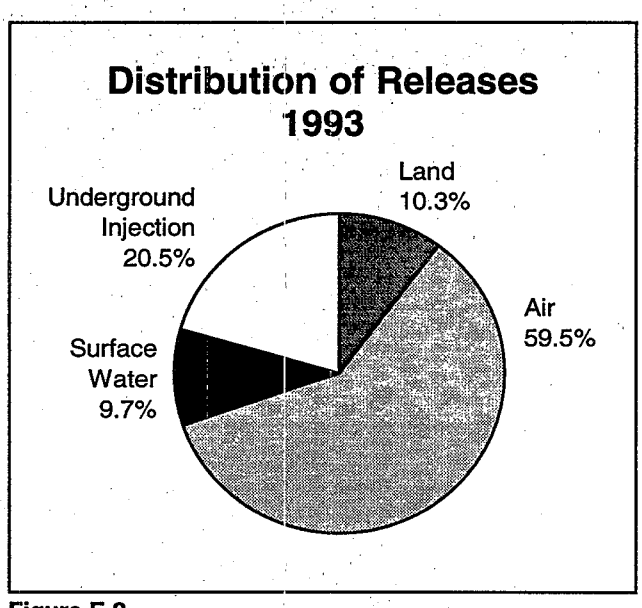


Figure E-2.

An Explanation of Off-site Transfers

Off-site Transfers. An off-site transfer is a shipment of toxic chemicals in waste to a facility that is geographically or physically separate from the facility reporting under TRI. Off-site transfers represent a movement of the chemical away from the reporting facility.

Transfers to Publicly Owned Treatment Works (POTWs). A POTW is a wastewater treatment facility (sewage treatment plant) that is owned by a state or municipality. Wastewaters are transferred through pipes or sewers to a POTW. Treatment or removal of a chemical from the wastewater depends upon the nature of the chemical, as well as the treatment methods used by the POTW. Not all TRI chemicals can be treated or removed by a POTW. Some chemicals are destroyed in treatment. Others may evaporate into the atmosphere. Some chemicals, such as metals, are removed but are not destroyed by treatment and may be disposed of in landfills. Some chemicals pass through the POTW and are discharged to receiving waters.

Transfers Off-site for Recycling. Toxic chemicals sent off-site for recycling may be recovered or regenerated by a variety of methods, including solvent recovery, metals recovery, and acid regeneration. Once recycled, these chemicals may be returned to the originating facility or sold for further processing or use.

Transfers Off-site for Energy Recovery. Toxic chemicals sent off-site for energy recovery are combusted off-site in industrial furnaces (including kilns) or boilers that generate heat or energy for use at that off-site location. Treatment of a chemical by incineration is not considered to be energy recovery.

Transfers Off-site for Treatment. Toxic chemicals sent off-site may be treated through a variety of methods, including biological treatment, neutralization, incineration, and physical separation. These methods result in varying degrees of destruction of the toxic chemical. In some cases (such as stabilization or solidification), the chemical is not destroyed but is prepared for further waste management, such as contained disposal.

Transfers Off-site for Disposal. Toxic chemicals sent off-site to a facility for disposal generally are either released to land or injected underground (see Box E-3 above) at the off-site location.

Other Off-site Transfers. In this report, "other off-site transfers" means transfers that were reported without an appropriate waste management activity code and therefore could not be assigned to a transfer category.

Box E-4.

Off-site Transfers

Facilities also must report the amounts of each listed chemical they ship to other locations for recycling, energy recovery, treatment, or disposal. Except for off-site transfers for disposal, these quantities do not necessarily represent entry of the chemical into the environment. Box E-4 explains each transfer type.

Transfers for treatment and disposal have been reported since 1987. Transfers for recycling and energy recovery have been reported since 1991.

In addition to quantities transferred, facilities also must provide the name and location of the site which will receive the shipment.

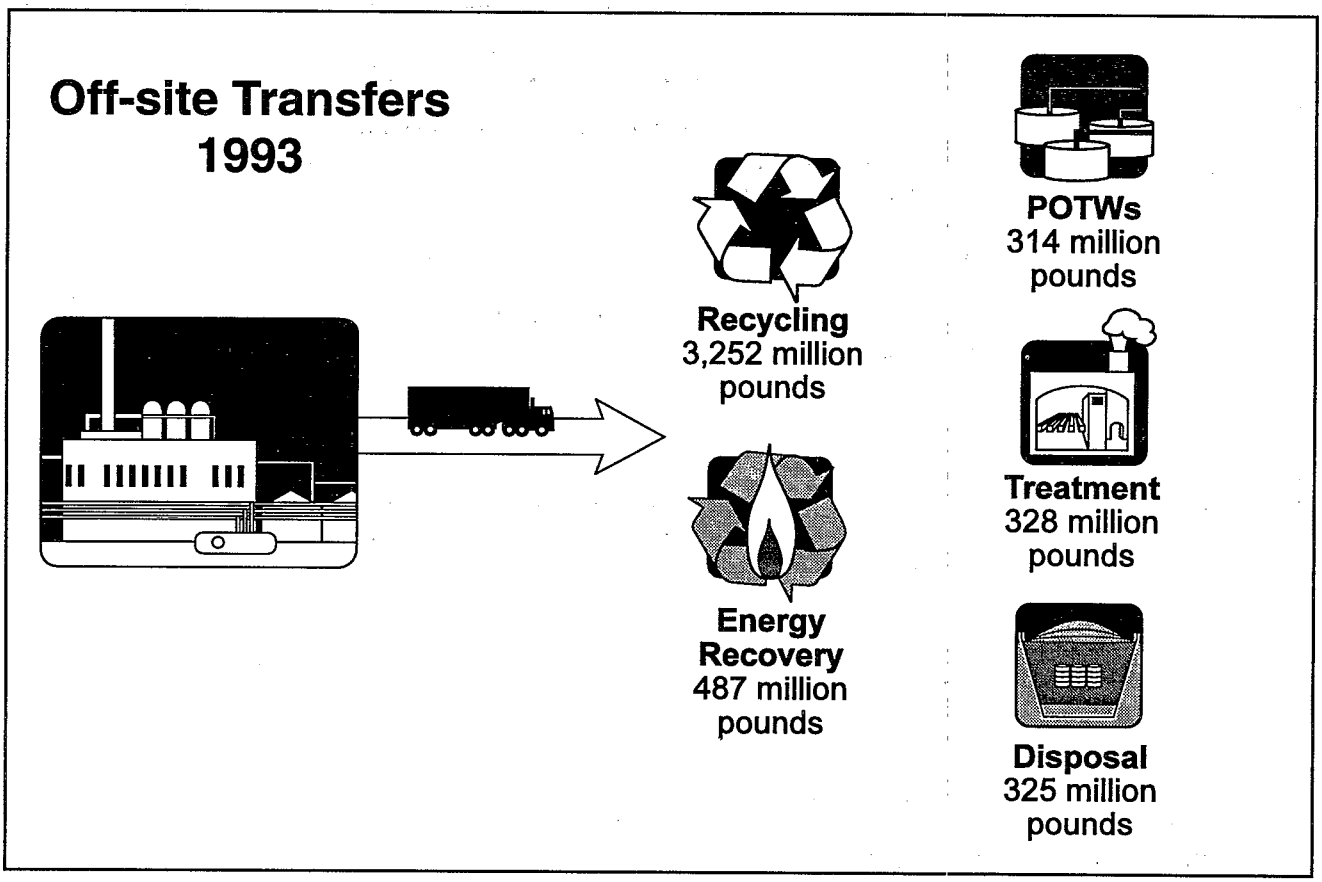


Figure E-3.❶

In 1993, facilities transferred more than 4.7 billion pounds of toxic chemicals in waste to off-site locations for recycling, energy recovery, treatment, and disposal. Figure E-3 shows the quantity of toxic chemicals transferred to off-site locations for each type of waste management activity.

Figure E-4 shows the distribution of transfers by waste management activity. Transfers of toxic chemicals to off-site locations for recycling accounted for 69% of all transfers. Less than 7% of all transfers were sent to off-site locations for disposal.

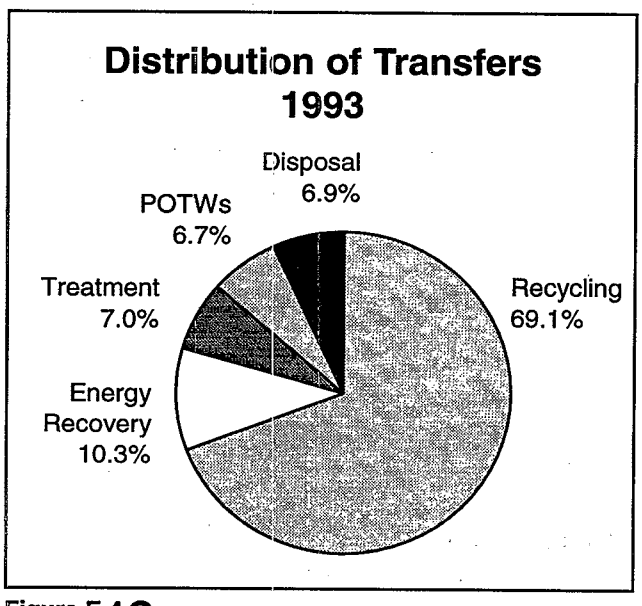


Figure E-4.❶

❶ Does not include "other" off-site transfers, i.e., those reported without valid waste management codes (2 million pounds).

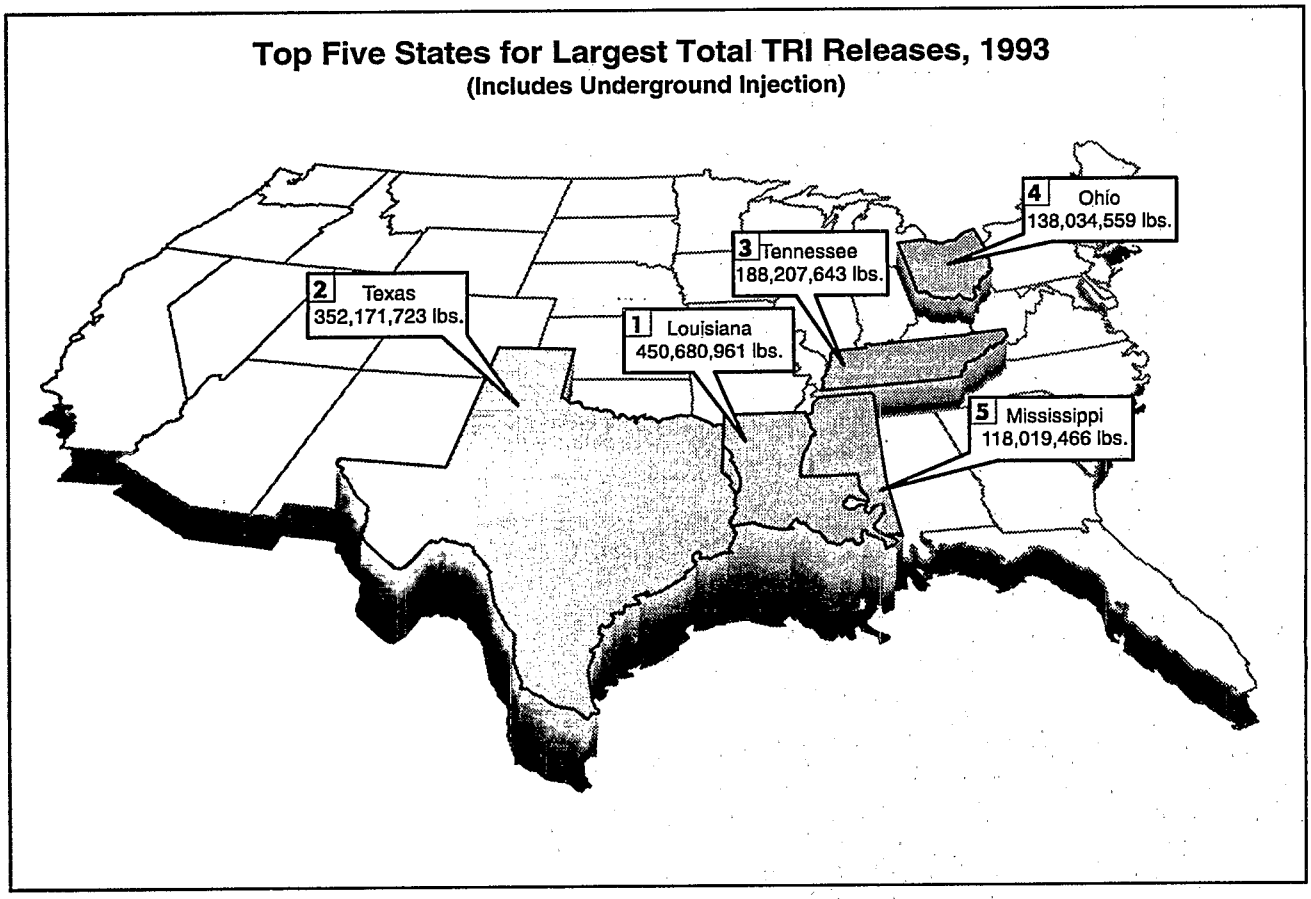


Figure E-5.

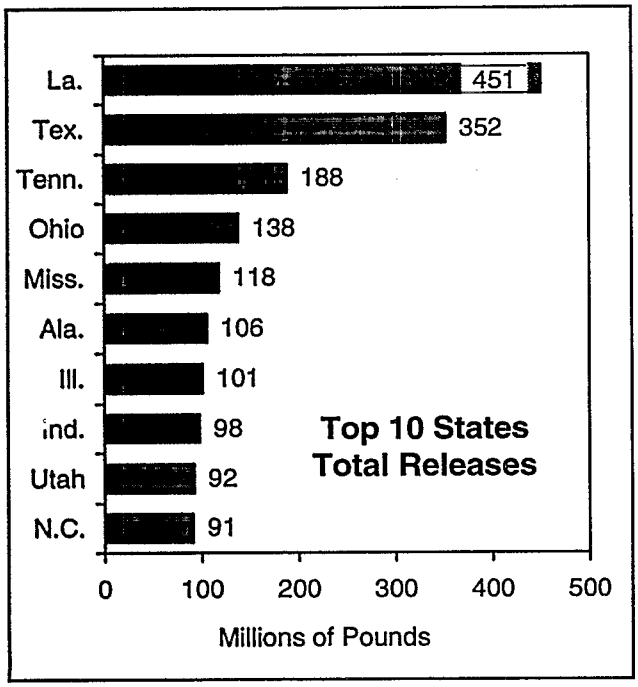


Figure E-6.

Total Releases by State, 1993
(Includes Underground Injection)

Figures E-5 and E-6 show the states with the largest quantities of reported toxic chemical releases in 1993, including releases to air, water, and land, as well as underground injection.

The total quantity of releases reported by these states does not necessarily indicate that risks from toxic chemicals are highest in these states. Release totals do not take into account the geographic size of the state or the size of the state's population. As discussed above, the risk from releases of toxic chemicals depends on a variety of factors, including the type of release, the toxicity of the chemical, and the proximity of populations to the releases.

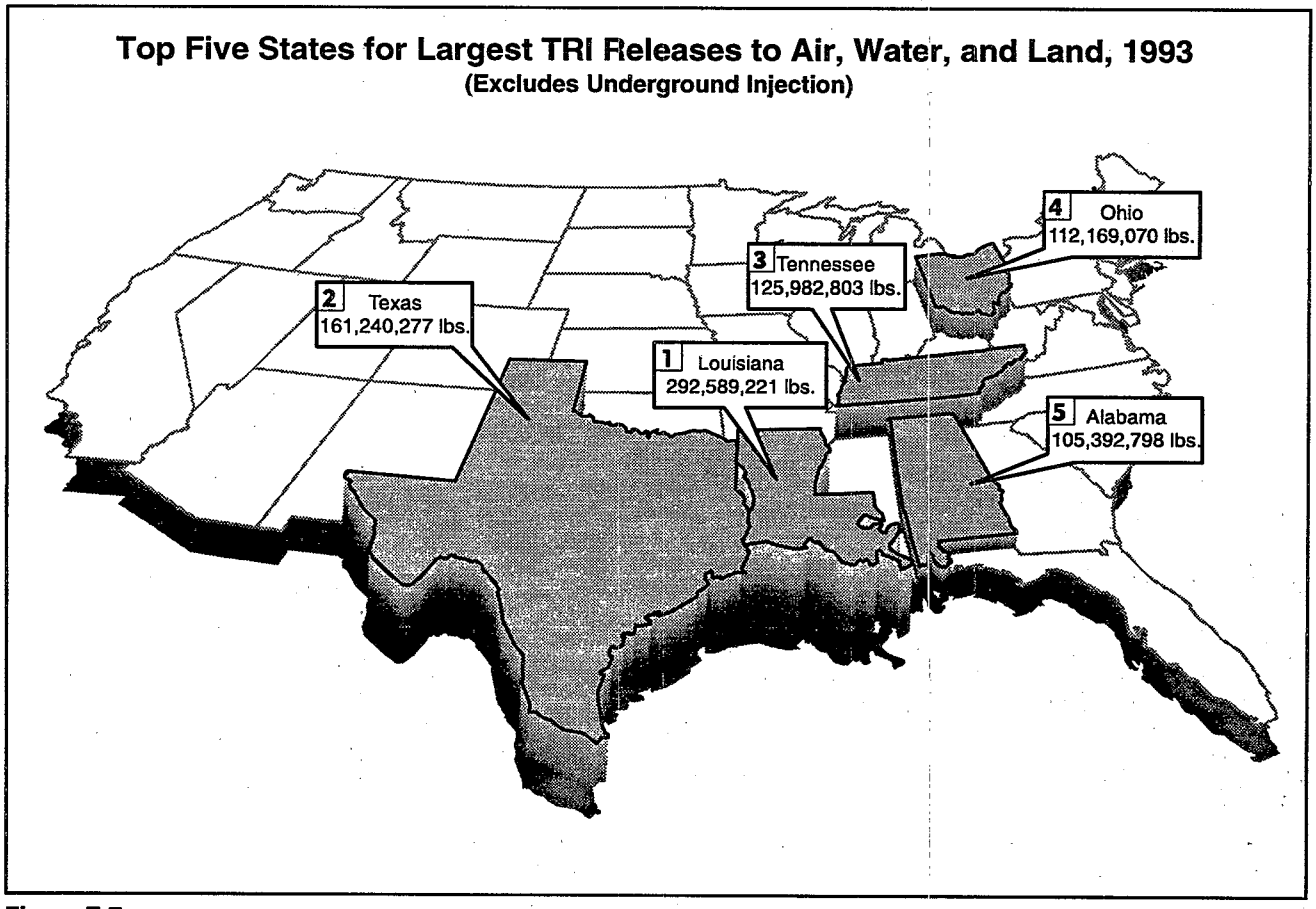


Figure E-7.

Air/Water/Land Releases by State, 1993 (Excludes Underground Injection)

Figures E-7 and E-8 show the states with the largest quantities of reported toxic chemical releases in 1993, excluding underground injection. This alternative ranking method is presented because releases to properly designed and constructed Class I injection wells have much lower exposure potentials than other, more direct forms of release.

Excluding underground injection from the release totals does not change the rankings for the top four states. However, Mississippi, which is ranked fifth for total releases, drops to 14th if underground injection is excluded.

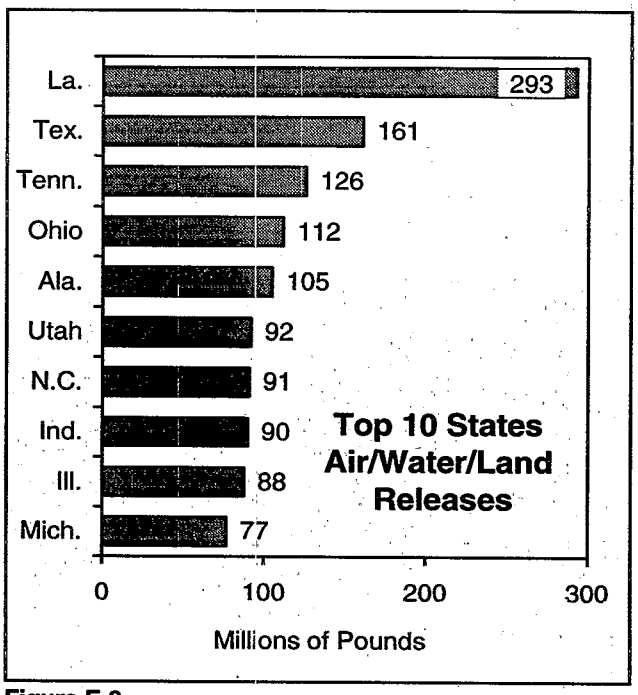


Figure E-8.

Standard Industrial Classification (SIC) Codes

20 Food and kindred products
21 Tobacco products
22 Textile mill products
23 Apparel and other finished products made from fabrics and similar materials
24 Lumber and wood products, except furniture
25 Furniture and fixtures
26 Paper and allied products
27 Printing, publishing, and allied industries
28 Chemicals and allied products
29 Petroleum refining and related industries
30 Rubber and miscellaneous plastics products
31 Leather and leather products
32 Stone, clay, glass, and concrete products
33 Primary metal industries
34 Fabricated metal products, except machinery and transportation equipment
35 Industrial and commercial machinery and computer equipment
36 Electronic and other electrical equipment and components, except computer equipment
37 Transportation equipment
38 Measuring, analyzing, and controlling instruments; photographic, medical and optical goods; watches and clocks
39 Miscellaneous manufacturing industries

Box E-5.

Releases and Transfers by Industry, 1993

Only manufacturing facilities in SIC codes 20 through 39 were required to report to TRI for 1993. Box E-5 lists the industry groups currently subject to TRI, along with their corresponding SIC codes. Federal facilities will be required to report to TRI beginning with the 1994 reporting year, and other industry groups are currently under consideration for future addition to the reporting requirements.

Figure E-9 presents the 10 industries with the largest quantities of reported toxic chemical releases, including underground injection, in 1993. The same industries comprise the top 10 for releases to air, water, and land (excluding underground injection). Figure E-10 presents the 10 industries with the largest total transfers to off-site locations.

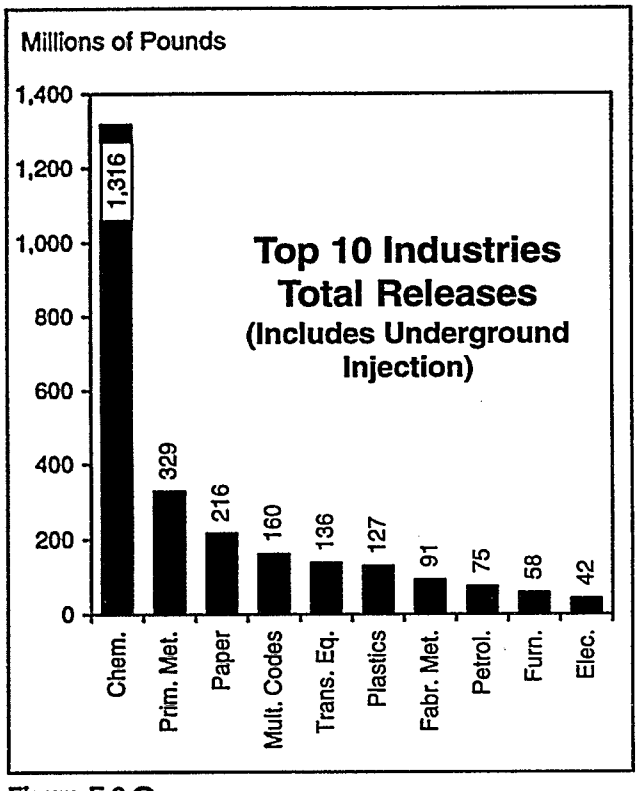


Figure E-9.❷

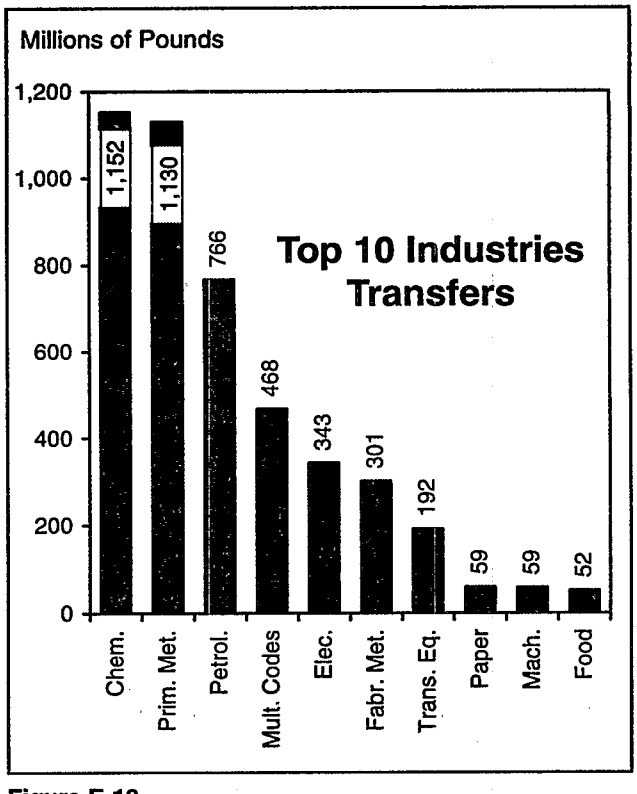


Figure E-10.

❷ Multiple Codes: Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].

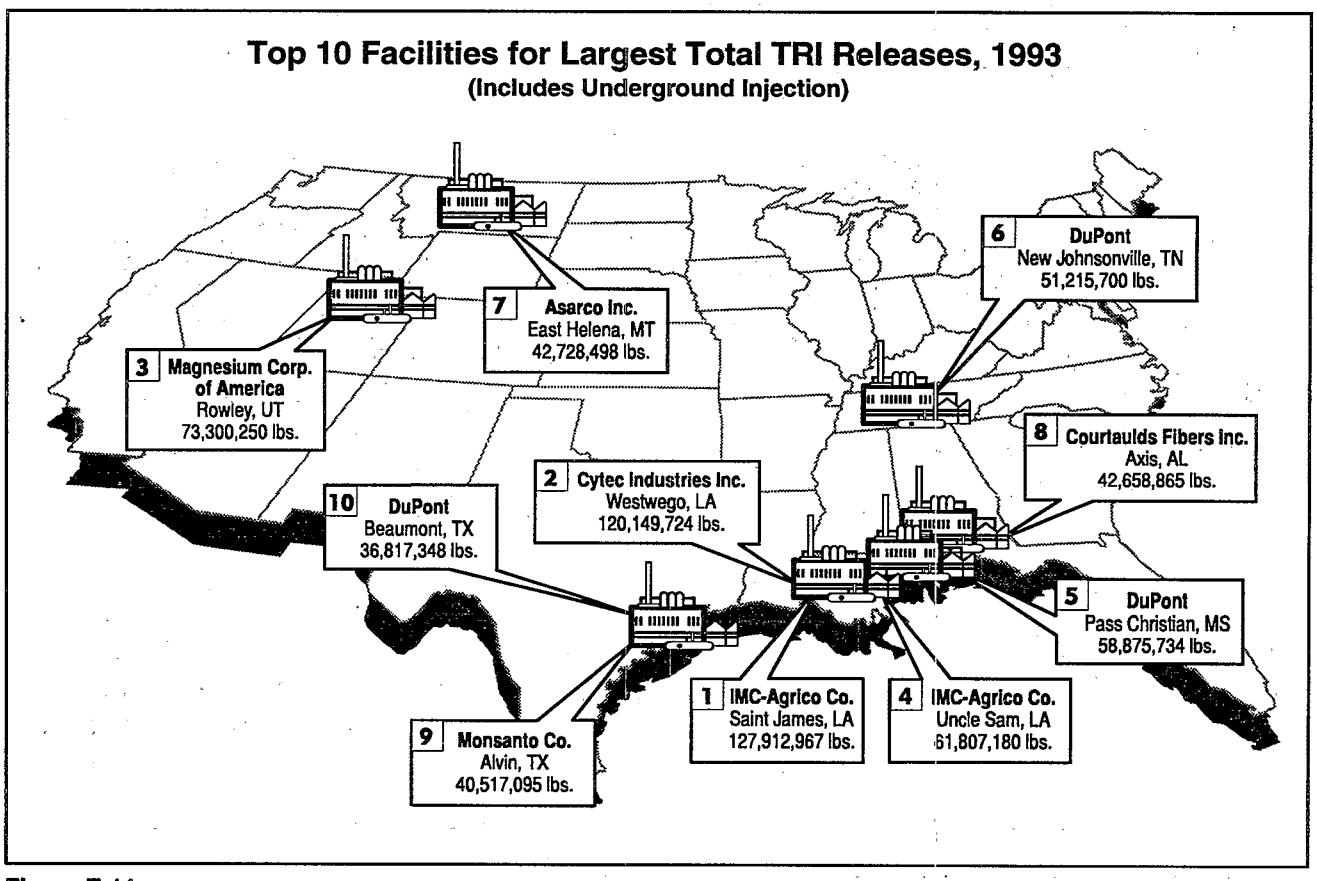


Figure E-11.

Figure E-11 shows the 10 facilities which reported the largest quantities of TRI releases, including underground injection, in 1993. The label next to each facility on the map lists the facility name, the city and state in which it is located, and the total quantity of TRI releases in 1993.

All facilities must report the name of their parent company, if applicable, on their Form Rs. The parent company is the highest-level company which owns or controls the reporting facility. Table E-1 lists the top ten parent companies for total TRI releases, including underground injection. Together, these 10 companies accounted for only 1.6% of all TRI reporting facilities and 4.0% of all forms filed, yet they accounted for 31.5% of total TRI releases in 1993.

Top 10 Parent Companies
Total Releases

Company Name	Facilities (Number)	Total Releases (Pounds)
DuPont	77	206,025,321
Freeport-McMoran Inc.	4	193,760,607
American Cyanamid	32	124,640,754
Renco Holdings Inc.	6	74,507,492
Asarco Inc.	13	57,057,182
Monsanto Co.	29	55,032,422
Eastman Kodak Co.	21	49,926,822
BP America	56	44,534,370
Courtaulds United States	11	43,728,541
General Motors Corp.	129	36,319,810
Subtotal	378	885,533,321
Total for All TRI Facilities	23,321	2,808,618,413

Table E-1.❸

❸ American Cyanamid no longer exists, but was in existence during 1993. Many of the releases attributed to American Cyanamid in 1993 will be associated with Cytec Industries in future years.

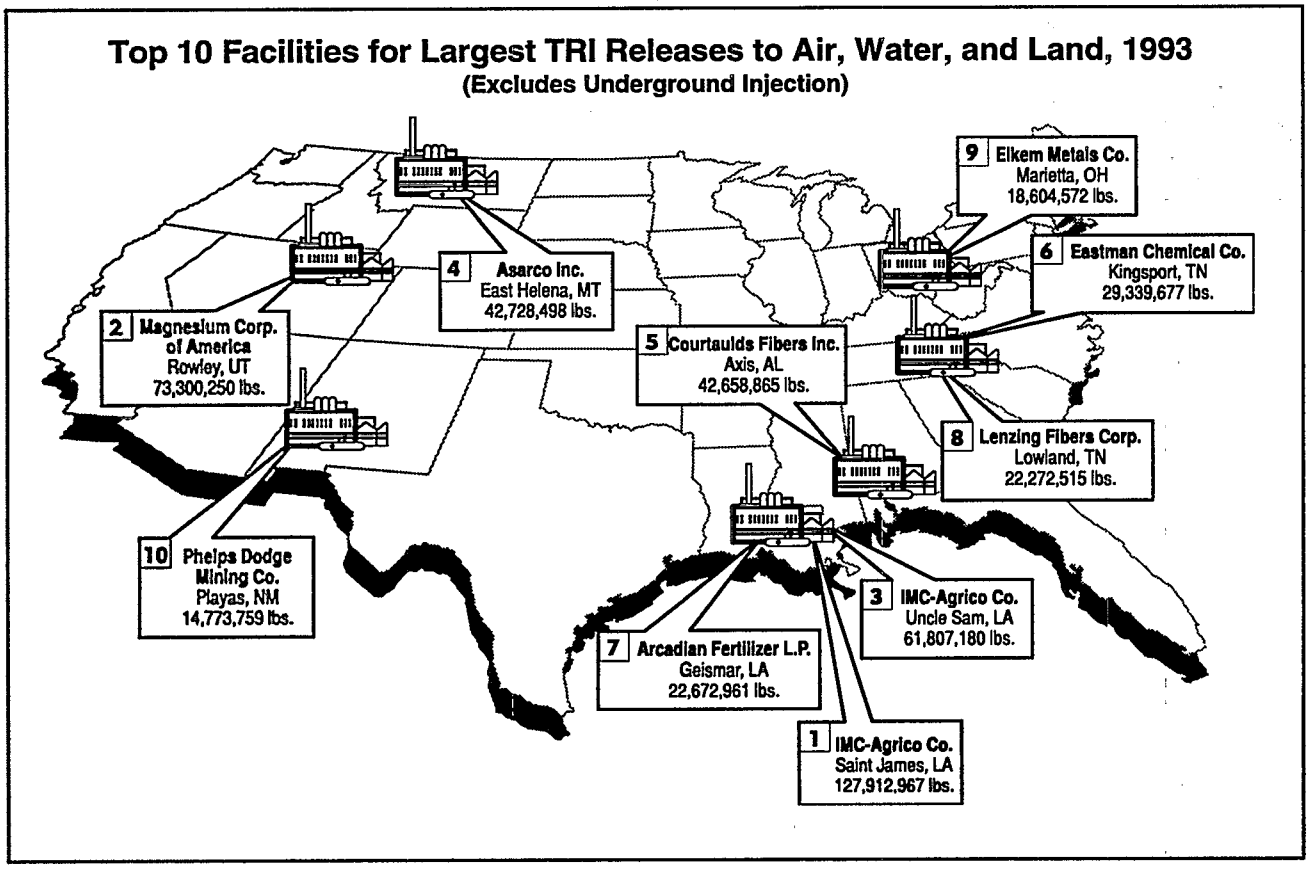


Figure E-12.

Top 10 Parent Companies Air/Water/Land Releases

Company Name	Facilities Number	Total Air/ Water/Land Releases Pounds
Freeport-McMoran Inc.	4	193,760,607
Renco Holdings Inc.	6	74,507,492
Asarco Inc.	13	51,224,547
Eastman Kodak Co.	21	49,926,822
Courtaulds United States	11	43,728,541
General Motors Corp.	129	36,319,810
Arcadian Fertilizer L.P.	8	35,252,458
DuPont	77	33,514,790
3M Co.	50	27,232,882
Phelps Dodge Corp.	18	27,128,900
Subtotal	337	572,596,849
Total for All TRI Facilities	23,321	2,232,333,180

Table E-2.

Figure E-12 shows the 10 facilities which reported the largest quantities of TRI releases to air, water, and land, excluding underground injection, in 1993. As discussed above, this alternative ranking method is presented because releases to properly designed and constructed Class I injection wells have much lower exposure potential than other, more direct, forms of release.

Table E-2 lists the top 10 parent companies for releases to air, water, and land, excluding underground injection, in 1993. Together, these 10 companies accounted for only 1.4% of reporting facilities and 3.7% of all forms, but 25.7% of releases to air, water, and land in 1993.

The following page shows the 10 chemicals released in the greatest quantity for each release type.

Top Chemicals by Release Media, 1993

Top 10 Chemicals Air

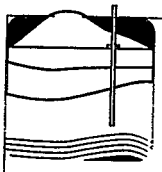
	Pounds
Toluene	177,301,671
Methanol	172,292,981
Ammonia	138,057,165
Acetone	125,152,462
Xylene (mixed isomers)	111,189,613
Carbon disulfide	93,307,339
Methyl ethyl ketone	84,814,923
Hydrochloric acid	79,073,655
Chlorine	75,410,108
Dichloromethane	64,313,211
Subtotal	1,120,913,128
Total for All TRI Chemicals	1,672,127,735

Table E-3.

Top 10 Chemicals Surface Water

	Pounds
Phosphoric acid	175,861,627
Ammonia	35,938,643
Sulfuric acid	27,542,946
Methanol	10,011,681
Ammonium nitrate (solution)	7,386,387
Ammonium sulfate (solution)	3,872,980
Ethylene glycol	1,170,533
Zinc compounds	1,046,444
Acetone	990,315
Hydrochloric acid	719,541
Subtotal	264,541,097
Total for All TRI Chemicals	271,152,864

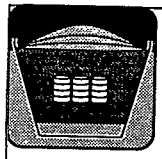
Table E-4.



Top 10 Chemicals Underground Injection

	Pounds
Ammonia	168,725,501
Hydrochloric acid	145,097,099
Sulfuric acid	105,872,094
Ammonium nitrate (solution)	35,211,208
Methanol	27,899,963
Nitric acid	19,213,898
Acetonitrile	15,707,895
Ammonium sulfate (solution)	6,189,894
Ethylene glycol	5,943,528
Formaldehyde	5,912,425
Subtotal	535,773,505
Total for All TRI Chemicals	576,285,233

Table E-5.



Top 10 Chemicals Land

	Pounds
Zinc compounds	67,413,392
Manganese compounds	47,671,055
Copper compounds	40,082,409
Phosphoric acid	35,491,946
Chromium compounds	22,675,748
Lead compounds	10,950,924
Zinc (fume or dust)	10,449,577
Ammonia	10,144,184
Manganese	6,650,151
Ammonium nitrate (solution)	6,457,512
Subtotal	257,986,898
Total for All TRI Chemicals	289,052,581

Table E-6.

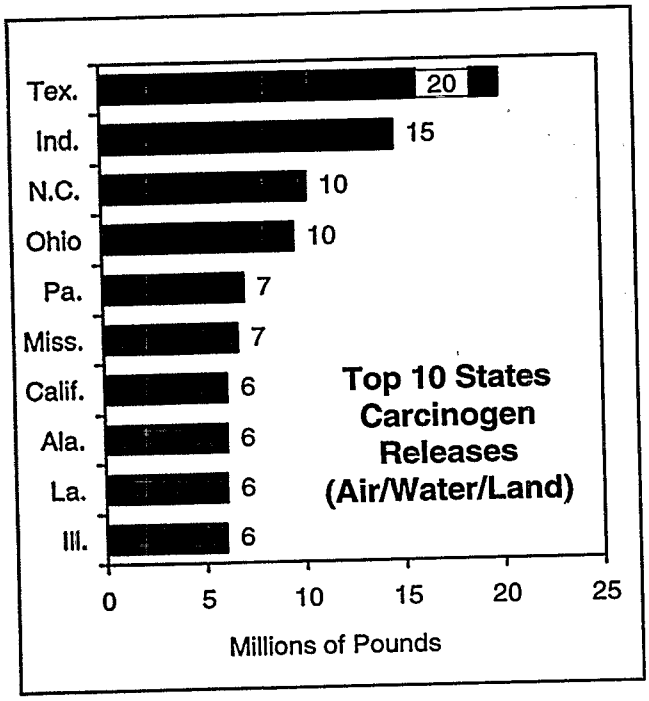


Figure E-13.

Carcinogen Releases to Air/Water/Land, 1993

(Excludes Underground Injection)

For reporting purposes, TRI designates 118 chemicals as carcinogens based on criteria set forth in the Occupational Safety and Health Administration's Hazard Communication Standards. Some of these chemicals, such as benzene or asbestos, are known to cause cancer in humans. Others are suspected to cause cancer in humans because they have been shown to cause cancer in laboratory animals.

Nearly 180 million pounds of TRI-listed carcinogens were released to the air, water, and land (excluding underground injection) in 1993. Figures E-13 and E-14 show the 10 states and 10 industries with the largest quantities of carcinogen releases to air, water, and land in 1993. Table E-7 lists the 10 TRI carcinogens released in the largest quantities to air, water, and land in 1993.

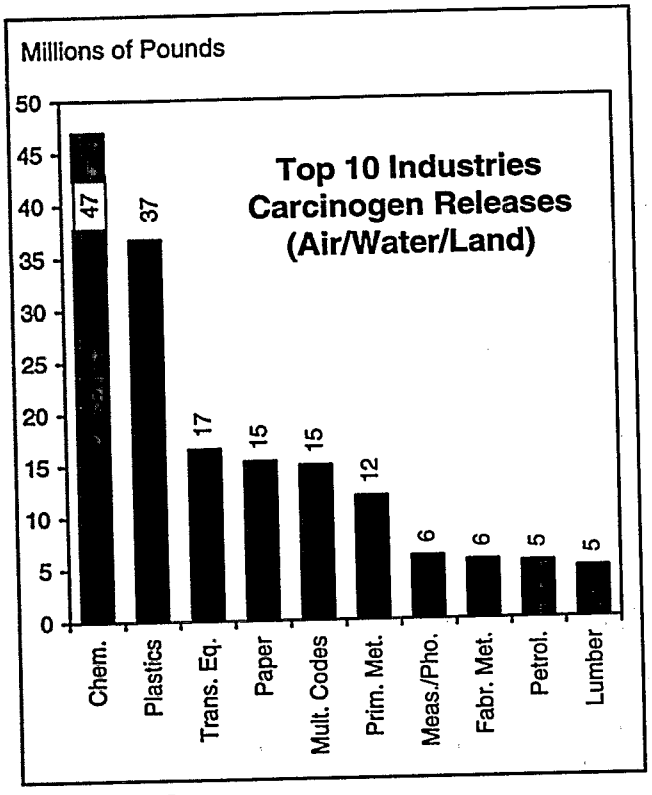


Figure E-14.❹

Carcinogens with Largest Air/Water/Land Releases

	Pounds
Dichloromethane	64,454,387
Styrene	32,776,445
Chloroform	14,292,980
Formaldehyde	12,207,744
Tetrachloroethylene	11,570,197
Benzene	10,845,433
Acetaldehyde	6,543,215
Lead	4,056,624
1,3-Butadiene	3,282,261
Nickel compounds	3,099,677
Subtotal	163,128,963
Total for All Carcinogens	179,858,444

Table E-7.

❹ Multiple Codes: Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].

CHAPTER 2: PREVENTION AND MANAGEMENT OF TRI CHEMICALS IN WASTE

The Pollution Prevention Act of 1990 (PPA) expanded TRI to require reporting about quantities of TRI chemicals managed in waste and about source reduction activities undertaken to eliminate or reduce those quantities. Under the PPA, source reduction is considered the preferred approach to managing waste. Figure E-15 illustrates a hierarchy for waste management decision-making, with disposal of waste the last resort.

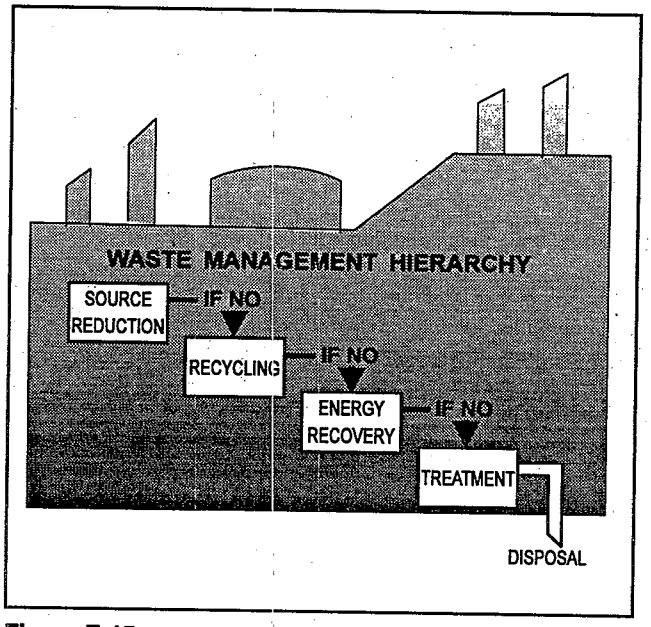


Figure E-15.

Figure E-16 illustrates the quantities of TRI chemicals undergoing each on-site and off-site waste management activity (recycling, energy recovery, treatment, and release/disposal). A total of 33.5 billion pounds of TRI chemicals was managed in waste in 1993.

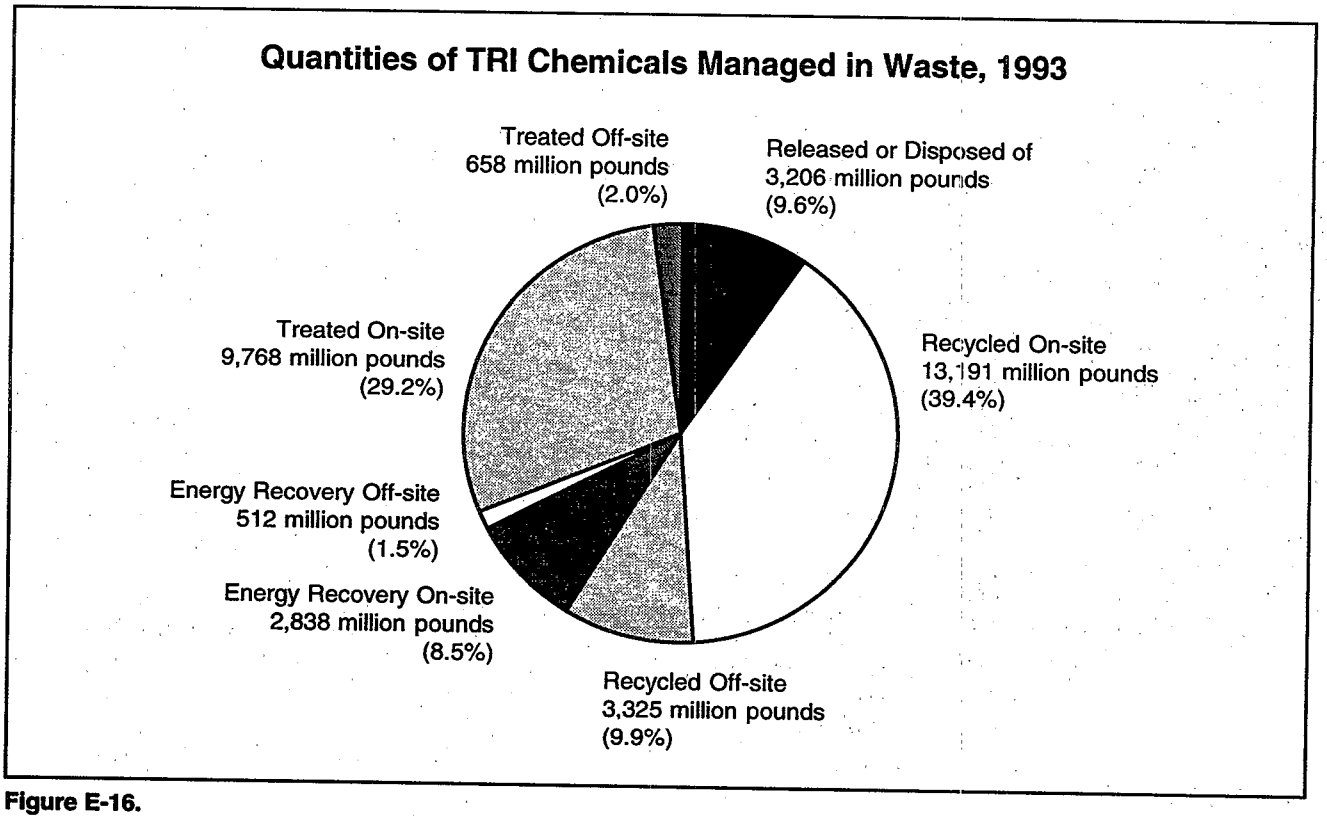


Figure E-16.

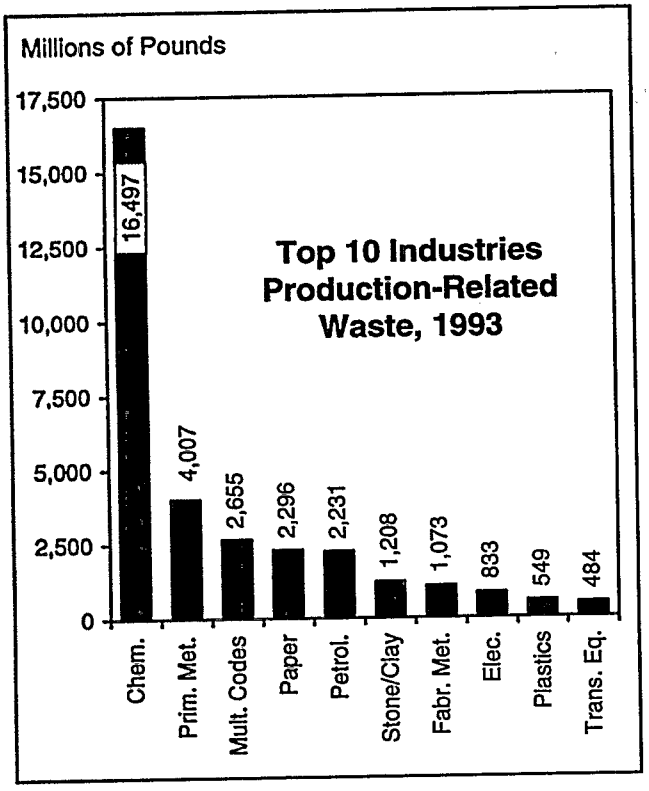


Figure E-17.❺

Figure E-17 shows the top 10 industries for total production-related waste in 1993. The chemical industry reported more than 16 billion pounds of TRI chemicals in production-related waste, nearly half of the total quantity reported by all industries and more than four times the amount reported by the second-ranked industry.

Figure E-18 shows the actual quantities of TRI chemicals reported for each waste management activity for 1991 through 1993, and the projected quantities for 1994 and 1995. Although the total quantity of TRI chemicals in production-related waste is increasing, some movement up the waste management hierarchy is seen in increased recycling and decreased release or disposal.

The following page shows the 10 chemicals undergoing each waste management activity in the largest quantities.

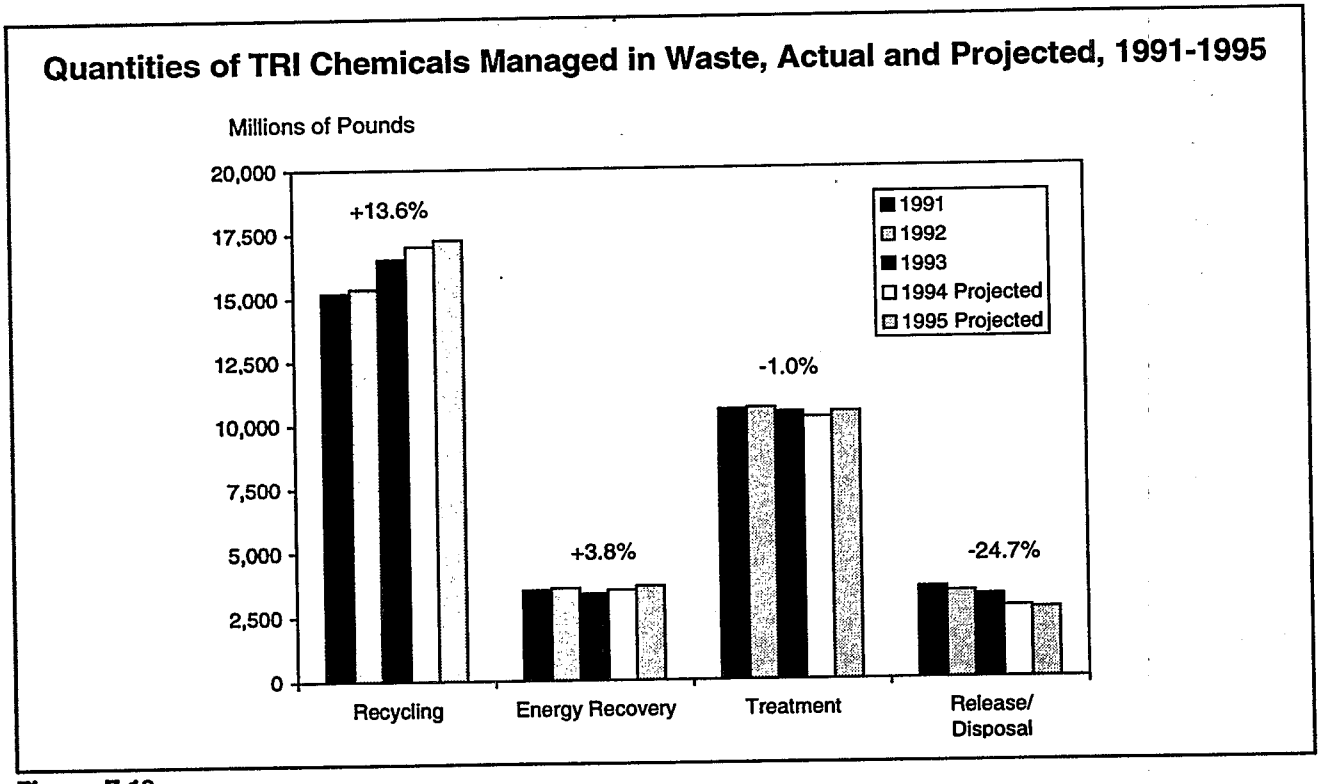
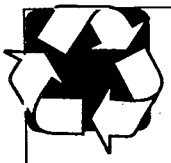


Figure E-18.

❺ Multiple Codes: Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].

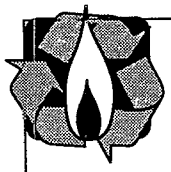
Top Chemicals by Waste Management Activity, 1993



Top 10 Chemicals Recycling

	Pounds
Sulfuric acid	7,137,133,908
Toluene	1,191,786,855
Copper	747,555,744
Lead compounds	649,807,005
Methanol	502,912,627
Ethylene	433,212,167
Copper compounds	390,397,586
Ethylene glycol	388,463,915
Zinc compounds	344,633,052
Lead	323,560,206
Subtotal	12,109,463,065
Total for All TRI Chemicals	16,515,920,583

Table E-8.



Top 10 Chemicals Energy Recovery

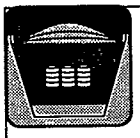
	Pounds
Propylene	491,329,899
Ethylene	419,022,752
Methanol	348,009,065
Toluene	341,738,331
Xylene (mixed isomers)	259,727,488
Acetone	173,643,561
Mixtures and other trade names	171,436,688
Methyl ethyl ketone	146,085,339
Ammonia	86,567,296
tert-Butyl alcohol	67,079,131
Subtotal	2,504,639,550
Total for All TRI Chemicals	3,350,119,881

Table E-9.

Top 10 Chemicals Treatment

	Pounds
Sulfuric acid	3,000,122,562
Hydrochloric acid	1,949,374,303
Methanol	987,336,098
Ammonia	451,633,343
Ethylene	373,572,787
Phosphoric acid	306,416,497
Nitric acid	298,588,152
Chlorine	246,159,502
Freon 113	230,733,955
Propylene	216,423,796
Subtotal	8,060,360,995
Total for All TRI Chemicals	10,426,058,390

Table E-10.



Top 10 Chemicals Release/Disposal

	Pounds
Ammonia	396,799,112
Sulfuric acid	254,999,222
Hydrochloric acid	241,034,754
Methanol	222,161,442
Phosphoric acid	214,596,798
Toluene	181,399,292
Zinc compounds	135,266,664
Acetone	128,689,551
Xylene (mixed isomers)	111,710,327
Carbon disulfide	93,697,475
Subtotal	1,980,354,637
Total for All TRI Chemicals	3,206,362,816

Table E-11.

Source Reduction Activities, 1993

Facilities also must provide information about source reduction activities they implemented during the reporting year. Source reduction activities reduce the amount of a toxic chemical entering a waste stream and therefore prevent pollution before it is generated. Waste management activities such as recycling are not considered source reduction because they manage toxic chemicals after they enter waste streams.

Thirty-five percent of all TRI facilities reported at least one source reduction activity in 1993. Table E-12 lists the categories of source reduction activities in order of reporting frequency. Table E-13 lists the top 10 industries based on the percentage of forms reporting source reduction. Table E-14 lists the 10 chemicals for which source reduction was reported the most often.

Source Reduction Activity Reporting

Category of Activity	Number of TRI Forms Reporting
Good operating practices	9,576
Process modifications	7,074
Spill and leak prevention	5,601
Raw material modifications	3,838
Inventory control	2,449
Cleaning and degreasing	2,395
Surface preparation and finishing	2,317
Product modifications	1,698

Table E-12.

Source Reduction Activity Reporting

Top Industries By Percentage of Forms	TRI Forms	Forms Reporting Source Reduction Activities	
	Number	Number	Percent
Measure./Photo.	991	379	38.2
Furniture	1,848	680	36.8
Printing	631	200	31.7
Leather	367	116	31.6
Miscellaneous	955	297	31.1
Multiple Codes 20-39 ❻	5,914	1,683	28.5
Transportation Equip.	4,908	1,383	28.2
Electrical	4,283	1,183	27.6
Plastics	4,293	1,174	27.3
Lumber	1,931	500	25.9
Subtotal	26,121	7,595	29.1
Total for All Industries	79,987	19,732	24.7

Table E-13.

Source Reduction Activity Reporting

Top Chemicals By Number of Forms	TRI Forms	Forms Reporting Source Reduction Activities	
	Number	Number	Percent
Toluene	3,569	1,376	38.6
Xylene (mixed isomers)	3,371	1,220	36.2
1,1,1-Trichloroethane	2,073	1,154	55.7
Sulfuric acid	5,640	944	16.7
Methyl ethyl ketone	2,418	904	37.4
Acetone	2,511	852	33.9
Methanol	2,424	618	25.5
Ammonia	3,096	618	20.0
Glycol ethers	2,162	591	27.3
Hydrochloric acid	3,279	567	17.3
Subtotal	30,543	8,844	29.0
Total for All TRI Chemicals	79,987	19,732	24.7

Table E-14.

❻ Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].

CHAPTER 3: YEAR-TO-YEAR COMPARISON OF RELEASES AND TRANSFERS

Because TRI data are collected annually, they can be used to measure progress in reducing toxic chemical releases and off-site transfers.

Reported toxic chemical releases decreased by 12.6% between 1992 and 1993, more than double the rate of decline between 1991 and 1992. Reported transfers increased by 4.1%, primarily due to increased transfers for recycling. Table E-15 compares the 1992 and 1993 release and transfer quantities. Since 1988, EPA's baseline year for TRI comparisons, toxic chemical releases have declined by 42.7%. Figure E-19 illustrates the change in each release type since 1988.

Releases and Transfers 1992-1993	1992-1993 Change	
	Millions of Pounds	Percent
Total Releases	**-406.5**	**-12.6**
Air	-200.5	-10.7
Surface Water	-5.0	-1.8
Underground Injection	-149.7	-20.6
Land	-51.3	-15.1
Total Transfers	**186.2**	**4.1**
Recycling	317.6	10.8
Energy Recovery	14.8	3.1
Treatment	-69.0	-17.4
POTWs	-122.4	-28.0
Disposal	61.4	23.3
Other[7]	-16.2	-89.9

Table E-15.

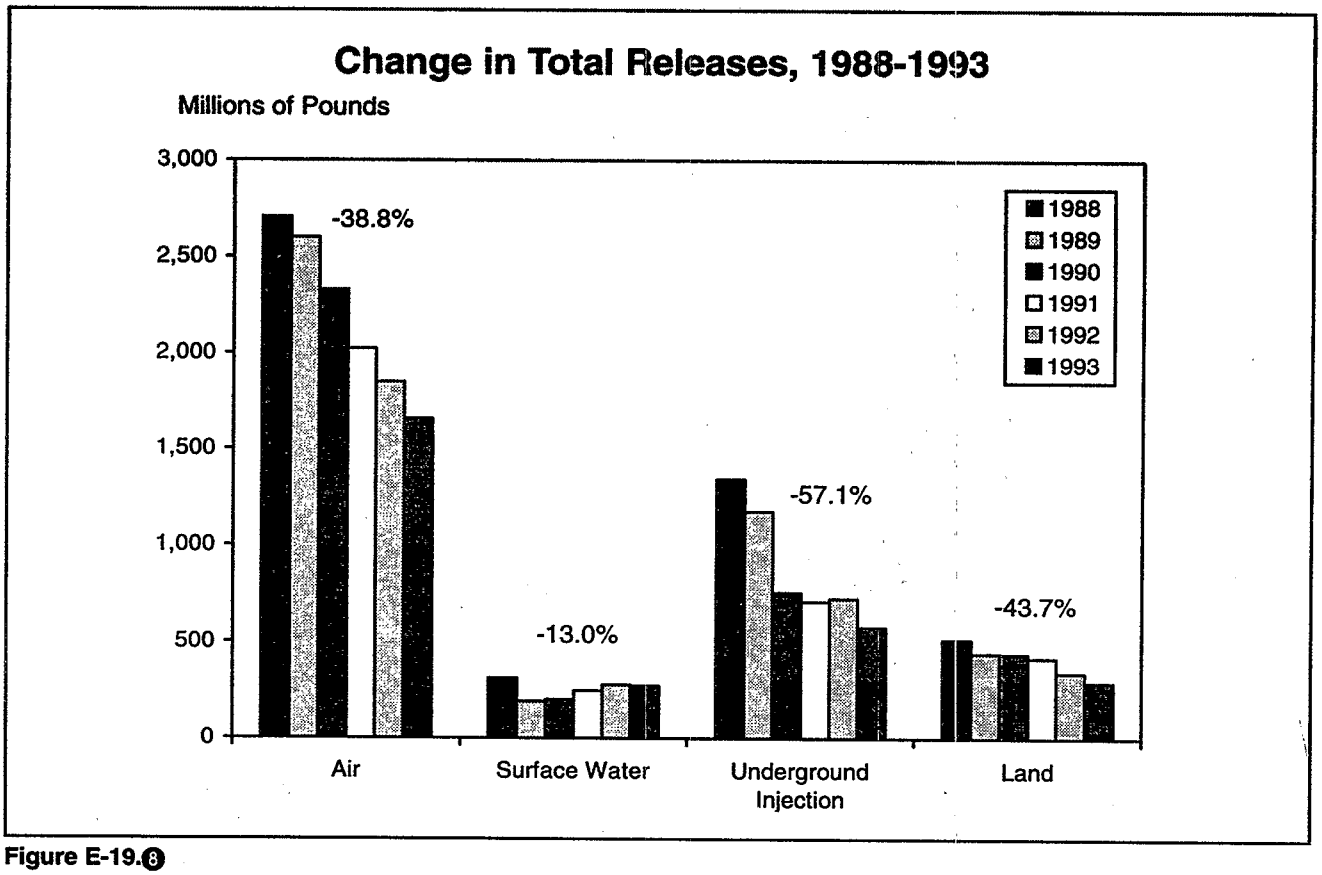


Figure E-19.[8]

[7] Transfers reported with no waste management codes or invalid codes.

[8] Does not include data for aluminum oxide, delisted chemicals, or chemicals added in 1990 and 1991.

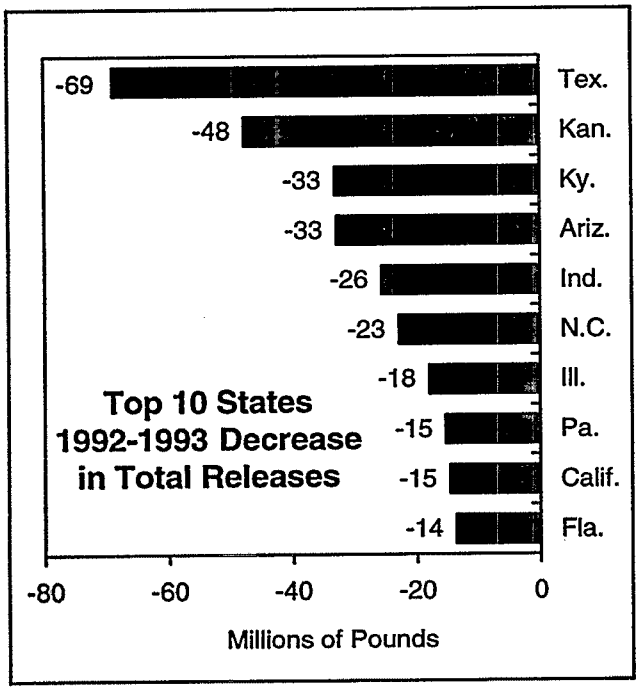


Figure E-20.

1992-1993 Change in Total Releases by State
(Includes Underground Injection)

Figure E-20 presents the 10 states with the largest poundage decrease in total releases (including underground injection) between 1992 and 1993. Figure E-21 illustrates the percentage change in total releases between 1992 and 1993 for each state.

Fifteen states reported a decrease in total releases of more than 20% since 1992. Six states and two territories reported increased releases between 1992 and 1993.

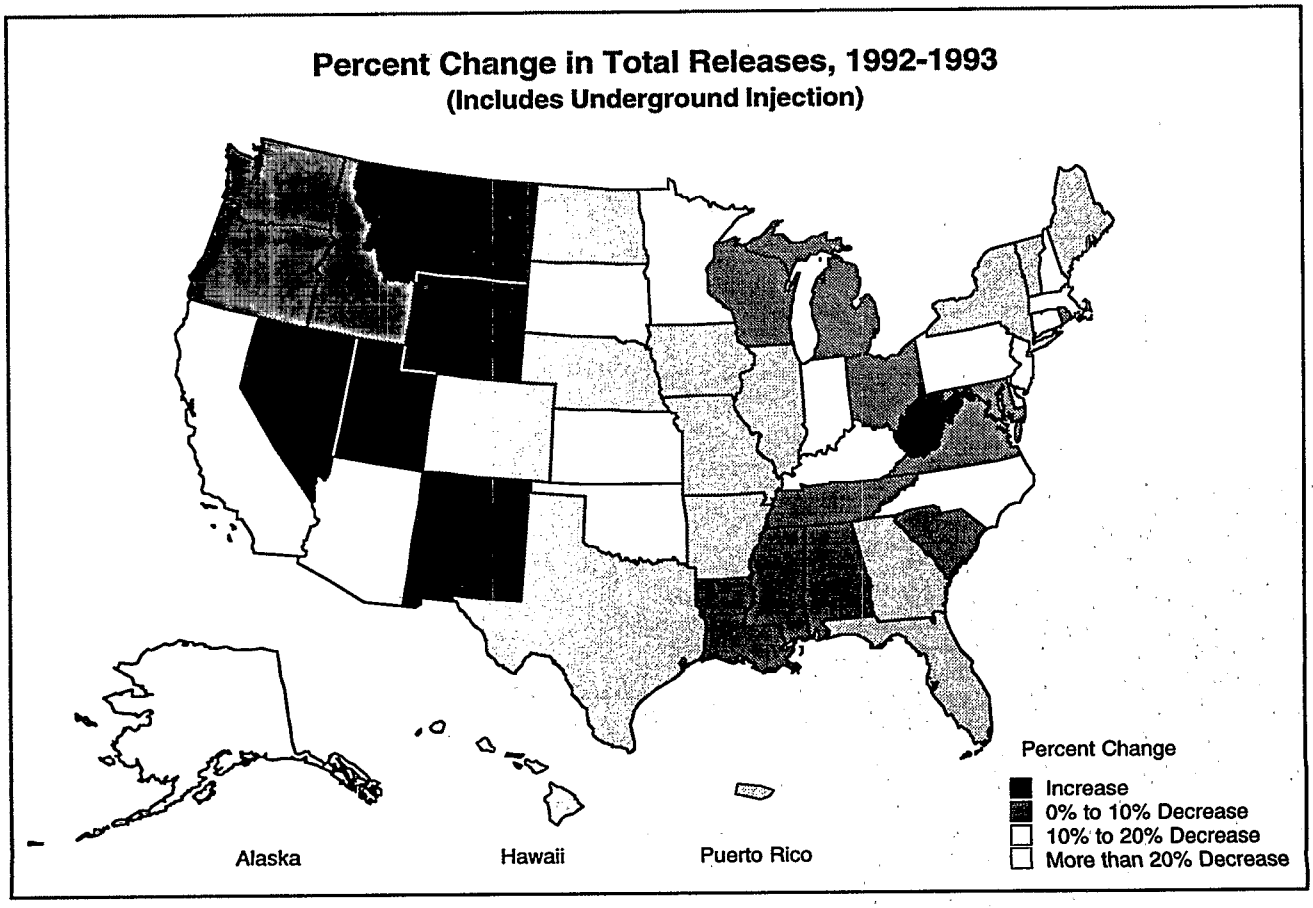


Figure E-21.

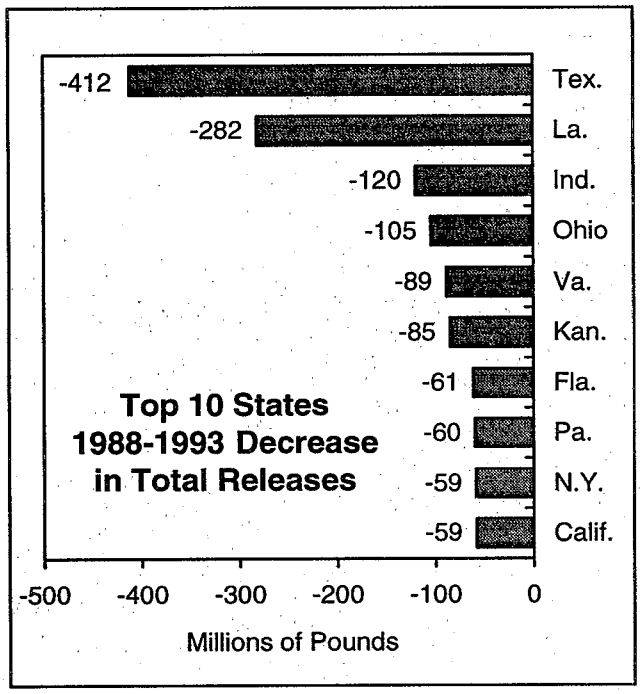


Figure E-22.

1988-1993 Change in Total Releases by State

(Includes Underground Injection)

Figure E-22 presents the 10 states with the largest quantity decrease in total releases (including underground injection) between 1988 and 1993. Figure E-23 displays the states by percentage change in total releases between 1988 and 1993.

Twenty-two states and the District of Columbia have reduced their total releases by more than 50% since 1988. Eight states have reduced their releases by less than 25% since 1988, compared to the national decrease of nearly 43%. Three states have reported an increase in total releases since 1988.

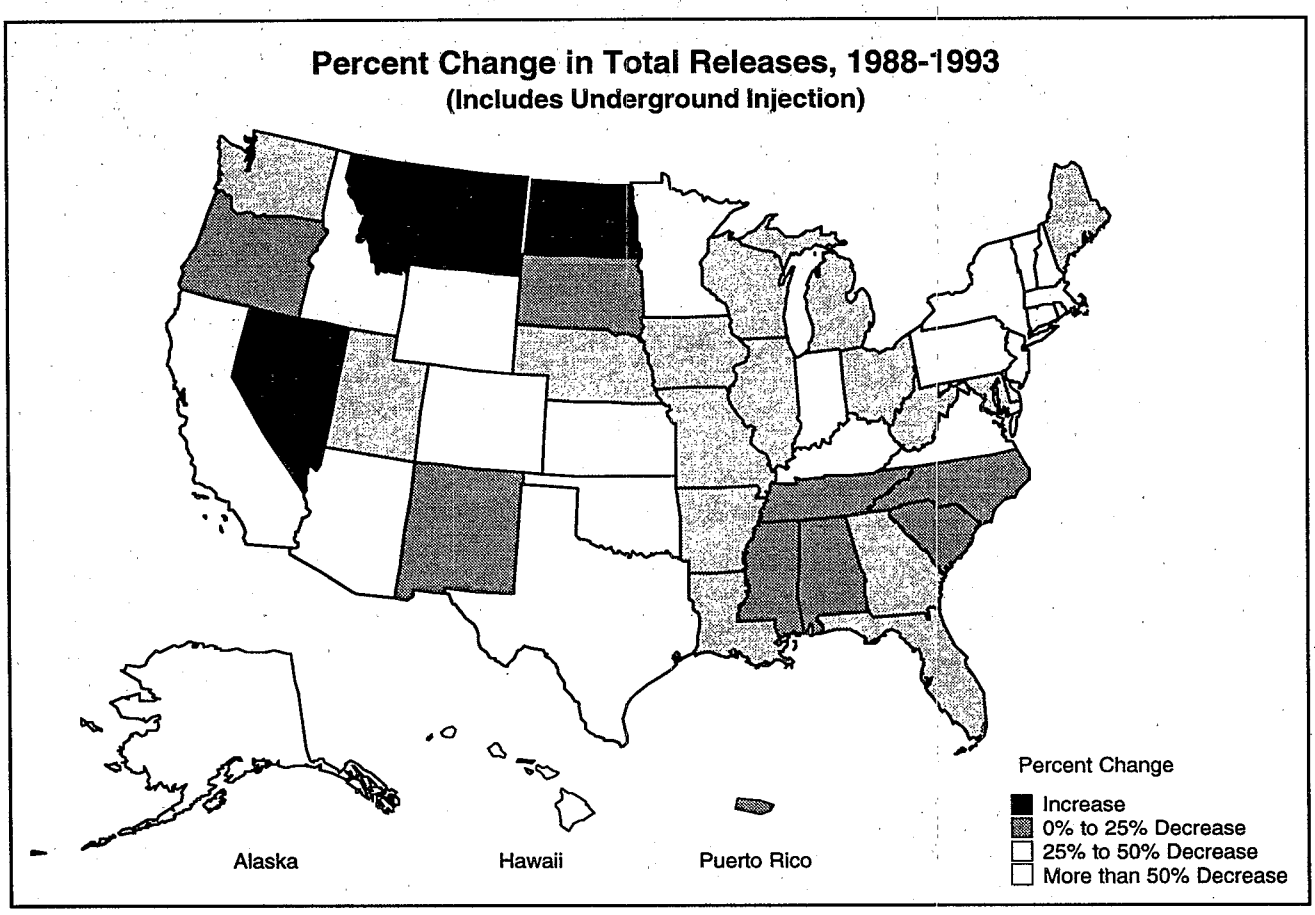


Figure E-23.

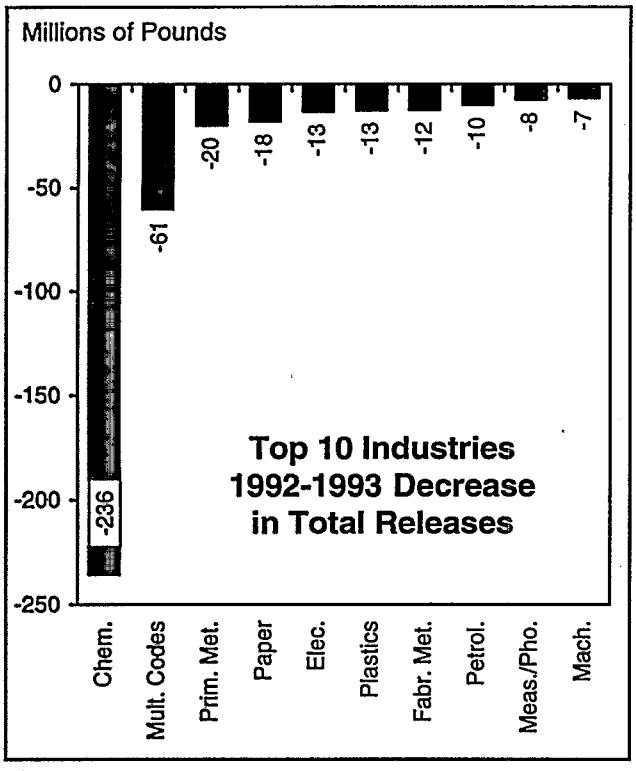


Figure E-24.

Change in Total Releases by Industry

Figure E-24 displays the 10 industries with the largest quantity decrease in total releases (including underground injection) between 1992 and 1993. Figure E-25 displays the 10 industries with the largest quantity decrease in total releases between 1988 and 1993.

Although the chemical industry has experienced the largest decrease in terms of pounds since 1988, several industries have experienced larger percentage reductions in total releases. For example, the electrical equipment industry has reduced its releases by 68.5% since 1988, compared to 43.8% for the chemical industry and 42.7% for all industries combined. Table E-16 lists the top 10 industries for percentage decrease in total releases since 1988.

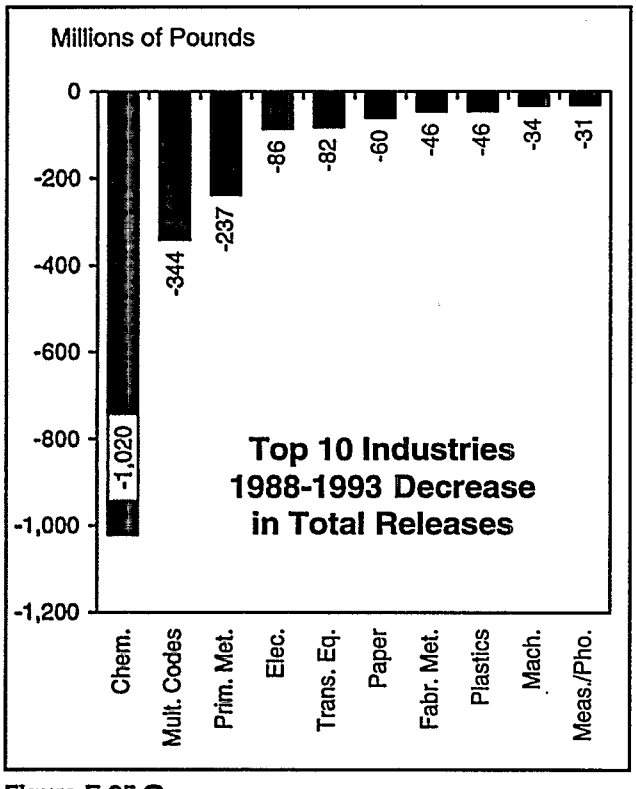


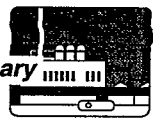
Figure E-25.

Top 10 Industries for 1988-1993 Percentage Decrease in Total Releases

	1988-1993 Change	
	Pounds	Percent
Electrical	-85,976,191	-68.5
Multiple Codes 20-39	-343,517,564	-68.3
Machinery	-33,825,370	-55.2
Measure./Photo.	-30,524,297	-53.4
Leather	-7,555,908	-47.5
Textiles	-17,761,858	-46.5
Miscellaneous	-14,379,030	-45.5
Chemicals	-1,019,874,077	-43.8
Primary Metals	-236,927,540	-41.9
Printing	-24,528,738	-40.2
Total for Top 10 Industries	-1,814,870,573	-47.9

Table E-16.

Multiple Codes: Facilities/forms that reported more than one 2-digit SIC code within the range of 20 to 39 [e.g., paper (26) and chemicals (28)].



Change in Total Releases by Chemical

Table E-17 lists the 10 chemicals with the largest quantity decrease in total releases (including underground injection) between 1992 and 1993. Two of the chemicals among the top 10 for decrease in total releases (1,1,1-trichloroethane and Freon 113) are ozone-depleting chemicals whose production will be banned as of January 1, 1996. The net decrease (decreases for some chemicals minus increases for others) for all TRI chemicals between 1992 and 1993 was 406 million pounds, or 12.6%.

Table E-18 lists the 10 chemicals with the largest quantity decrease in total releases (including underground injection) between 1988 and 1993. The 98% decline in releases of ammonium sulfate (solution) is largely attributable to a change in reporting method for this chemical rather than to actual reductions in releases. The net decrease for all TRI chemicals between 1988 and 1993 was nearly 2.1 billion pounds, or 42.7%.

Table E-19 lists the 10 chemicals with the largest increases in total releases (including underground injection) between 1988 and 1993.

1992-1993 Decrease in Total Releases

Chemical	1992-1993 Change	
	Pounds	Percent
Ammonia	-113,011,644	-24.3
Hydrochloric acid	-62,028,328	-21.6
1,1,1-Trichloroethane	-53,042,379	-45.3
Methanol	-41,931,828	-16.5
Toluene	-17,837,961	-9.1
Manganese compounds	-16,173,398	-24.3
Freon 113	-15,065,503	-60.5
Copper	-11,592,214	-80.9
Dichloromethane	-10,378,371	-13.7
Acetone	-10,188,311	-7.3
Total for Top 10 Chemicals	-351,249,937	-21.4

Table E-17.

1988-1993 Decrease in Total Releases

Chemical	1988-1993 Change	
	Pounds	Percent
Ammonium sulfate (solution)	-593,862,296	-98.0
Hydrochloric acid	-255,372,525	-53.1
Toluene	-121,071,663	-40.4
1,1,1-Trichloroethane	-115,415,330	-64.3
Acetone	-84,373,471	-39.4
Methanol	-77,945,453	-26.9
Dichloromethane	-65,526,833	-50.0
Chlorine	-65,000,624	-46.0
Freon 113	-60,702,551	-86.1
Methyl ethyl ketone	-55,214,405	-39.2
Total for Top 10 Chemicals	-1,494,485,151	-58.5

Table E-18.⓾

1988-1993 Increase in Total Releases

Chemical	1988-1993 Change	
	Pounds	Percent
Phosphoric acid	35,370,949	20.0
Copper compounds	14,413,640	43.4
Ethylbenzene	2,877,323	36.8
Ammonia	2,841,897	0.8
1,2,4-Trimethylbenzene	2,237,166	50.6
Acrylamide	1,813,597	81.4
Methyl tert-butyl ether	1,327,068	50.6
Acetamide⓫	1,089,016	—
Methylenebis(phenylisocyanate)	1,016,774	304.9
Decabromodiphenyl oxide	658,075	1269.3
Total for Top 10 Chemicals	63,645,505	11.0

Table E-19.⓾

⓾ Calculation of top chemicals does not include data for aluminum oxide, delisted chemicals, or chemicals added in 1990 and 1991.

⓫ No releases were reported for this chemical in 1988, although it was included on the TRI list that year.

CHAPTER 4: TRI REPORTING PROFILES FOR 33/50 PROGRAM CHEMICALS

The 33/50 Program is a voluntary pollution prevention initiative that targets 17 high-priority TRI chemicals for reductions in releases and transfers (see Box E-6). The program derives its name from its reduction goals: an interim goal of a 33% reduction in the 1992 reporting year and an ultimate goal of a 50% reduction in the 1995 reporting year, as measured against 1988 TRI data. These goals include all releases, as well as transfers to off-site locations for treatment and disposal. Transfers for recycling and energy recovery are not included because they were not reportable in 1988.

Releases and transfers of these 17 targeted chemicals declined by 100 million pounds, or 11%, between 1992 and 1993. Reductions since 1988 total 46% (see Figure E-26). Facilities owned by companies participating in the 33/50 Program, representing just a third of the total number of facilities reporting Program chemicals to TRI, accounted for 98% of the 100 million pound reduction in the last year, experiencing an average reduction of more than 20% (and 57% since 1988). Non-participating facilities reported virtually no reductions in 33/50 Program emissions in 1993.

In the first two years after the Program's goals were announced (1991 and 1992), the rate of reduction for 33/50 Program chemicals significantly outpaced the rate for non-Program chemicals. However, between 1992 and 1993, releases and transfers of non-Program chemicals declined by 13%, compared to an 11.0% decline for 33/50 Program chemicals. Figure E-27 compares the annual reduction rates of the 33/50 Program chemicals to the rates for all other TRI chemicals.

17 Priority Chemicals Targeted by the 33/50 Program

Benzene
Cadmium and compounds
Carbon tetrachloride
Chloroform
Chromium and compounds
Cyanide compounds
Dichloromethane
Lead and compounds
Mercury and compounds
Methyl ethyl ketone
Methyl isobutyl ketone
Nickel and compounds
Tetrachloroethylene
Toluene
1,1,1-Trichloroethane
Trichloroethylene
Xylenes

Box E-6.

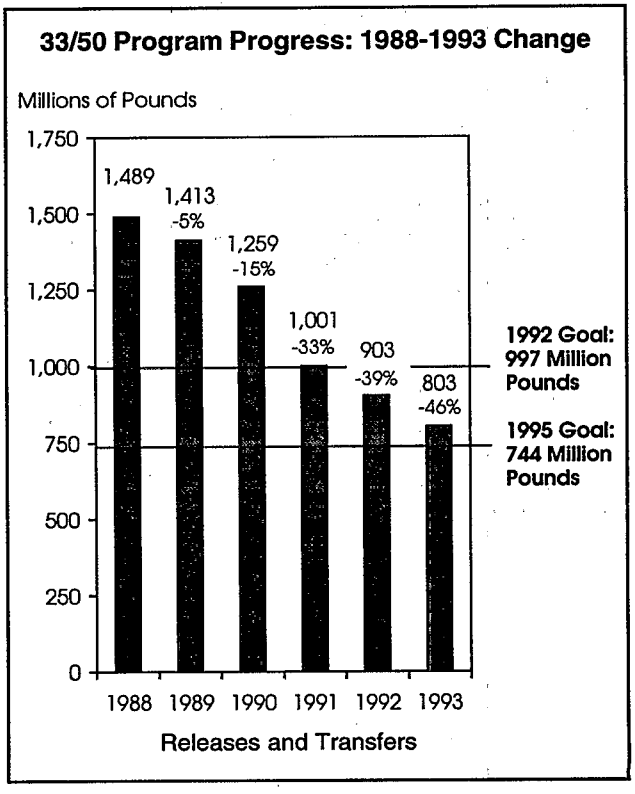


Figure E-26.

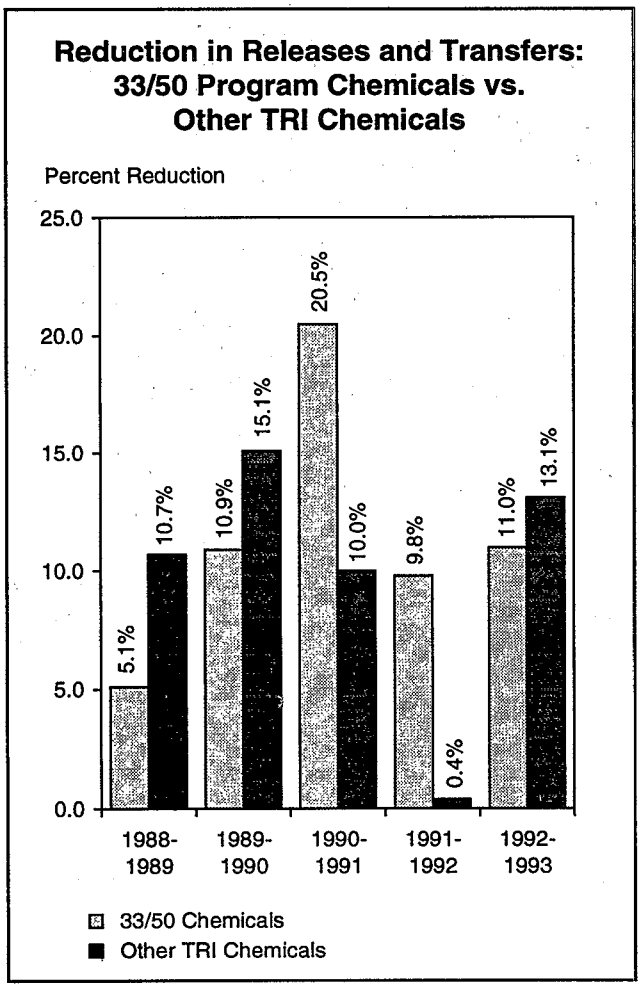


Figure E-27.⓬

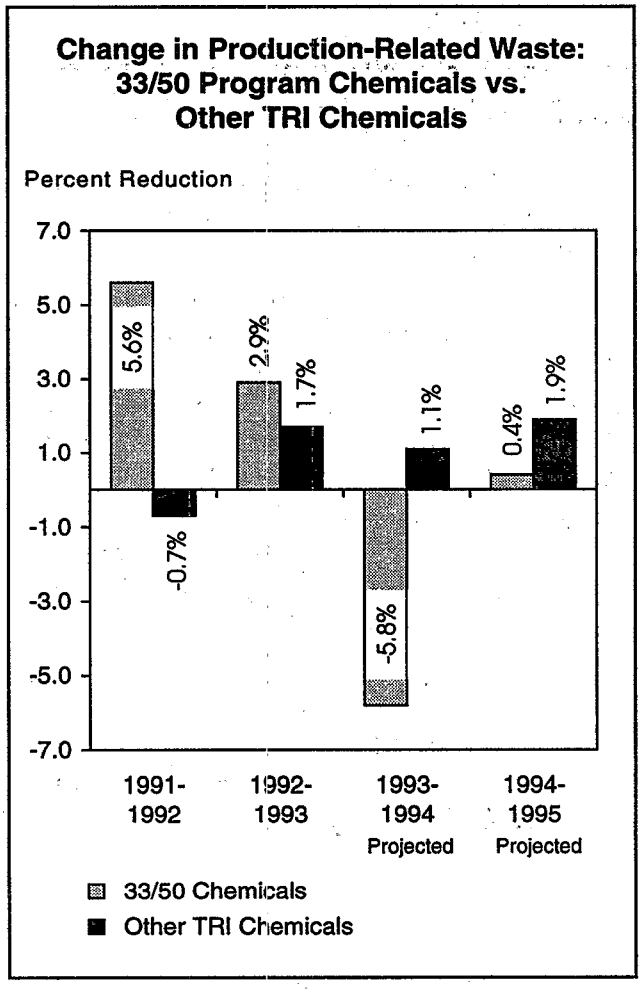


Figure E-28.⓭

Total production-related waste associated with 33/50 Program chemicals increased by 2.9% between 1992 and 1993. However, facilities are projecting that total production-related waste associated with 33/50 Program chemicals will decline by nearly 6% in 1994, while production-related waste associated with non-Program chemicals is projected to rise. Figure E-28 compares the annual changes in total production-related waste for 33/50 Program chemicals and non-Program chemicals.

Facilities owned by companies participating in the 33/50 Program reported a slight reduction in 33/50 Program chemical production-related waste in 1993 (0.5%) and are projecting substantial additional reductions by 1995 (15%). Non-participating facilities reported a nearly 8% rise in 33/50 Program production-related waste in the last year and project an increase of an additional 7% by 1995.

Facilities report a higher rate of source reduction activities for 33/50 Program chemicals than for non-Program chemicals. In 1993, nearly one-third of all forms for 33/50 Program chemicals reported one or more source reduction activities undertaken that year for the chemical. This compares to just over 21% for all other TRI chemicals.

⓬ The amounts for recycling and energy recovery reported for 1991-1993 have not been included in these totals.

⓭ 1991 as reported on the 1992 Form R for the previous year.

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1993 Toxics Release Inventory

Public Data Release

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Summarizes the national TRI data for 1993 and provides limited comparison data for 1988, 1991, and 1992. Included is information on releases and transfers of TRI chemicals, management of TRI chemicals in waste, and achievements of the 33/50 Program of voluntary toxics reduction. Includes national summaries, plus complete data tables by state, by industry group, and by chemical. (418 pp.)

☐ *1993 Toxics Release Inventory Public Data Release State Fact Sheets* (EPA 745-F-95-002)

Provides a two-page summary of 1993 basic TRI data for each state, including release, transfer, and waste management totals, state rankings, top five chemicals released in the state, and top 10 facilities for TRI releases in the state. Includes information about state TRI programs. (114 pp.)

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